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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/087,994 | 03/05/2002 | Noriyuki Yamamoto | 900-420 | 4459 |

7590 08/23/2004

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1100 North Glebe Road
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EXAMINER

CREPEAU, JONATHAN

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| ART UNIT | PAPER NUMBER |
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1746

DATE MAILED: 08/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|---------------------------------|---------------------------------|--|
| Office Action Summary | Application No. 10/087,994 | Applicant(s) YAMAMOTO ET AL. | |
| | Examiner Jonathan S. Crepeau | Art Unit 1746 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6 and 7 is/are rejected.
- 7) ☒ Claim(s) 4 and 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>3/5/02</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heller (U.S. Patent 6,531,239).

The reference is generally directed to a biological fuel cell. The cell comprises an anode and a cathode, each comprising a biochemical catalyst, and a PEM electrolyte (see col. 3, line 33). A further biochemical catalyst (e.g., enzyme) may be present for decomposing a fuel to be supplied to the anode (see col. 12, line 33 et seq. col. 13, line 8 et seq.). The additional catalyst is supported on a sol-gel matrix which has been treated so as to render it electrically conductive (see col. 12, lines 19 and 39). The material for the fuel can be a sugar, alcohol, or carboxylic acid (see col. 12, line 45).

The reference does not expressly teach that the fuel cell comprises a housing, as recited in claims 1 and 3, or that the additional catalyst is provided between an anode-side supply inlet and the anode, as recited in claim 1. The reference also does not expressly teach that the catalyst is disposed upstream of the anode-side supply inlet on a filter, as recited in claim 3.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to incorporate the fuel cell of Heller into a housing. Such a housing would be useful to prevent mixing of reactants and to extend the life of the components of the cell. Further, the artisan would be motivated use the additional enzyme catalyst layer of Heller as an anode current collector, as recited in claims 1 and 2. As noted above, Heller teaches that the sol-gel substrate possesses electrical conductivity, and additionally, teaches that the additional enzyme is provided "in proximity to or disposed on" the anode (col. 13, line 8). Thus, the artisan would be guided to position the enzyme-containing sol-gel substrate directly before the anode, e.g., as a current collector. Furthermore, the artisan would be sufficiently skilled to place the catalyst layer of Heller in a different area of the fuel cell system, so long as it is upstream of the anode. As such, the limitation that the catalyst is located upstream of the anode-side supply inlet as a filter in the supply section is not considered to distinguish over the reference. Generally, a mere rearrangement of parts is not sufficient to patentably distinguish over the prior art (MPEP §2144.04).

Allowable Subject Matter

3. Claims 4 and 5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
4. The following is a statement of reasons for the indication of allowable subject matter:

Claim 4 recites, among other features, that the biochemical catalyst is hydrogen-generative. Heller, the closest prior art, teaches that the additional enzyme converts the raw materials into sugars, alcohols, and carboxylic acids (col. 13, line 12). However, the reference does not teach or fairly suggest that the additional enzyme produces hydrogen (further, hydrogen would not be capable of being broken down on the first anode enzyme). As such, claim 4 contains allowable subject matter. Claim 5 recites a specific combination of hydrogen-generative catalysts and also distinguishes over Heller.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr, can be reached at (571) 272-1414. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau

Patent Examiner

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August 19, 2004